

OPTIMIZING FACTORY LAYOUTS WITH VIRTUAL FACTORY PLANNING: A GUIDE FOR SMBS

White Paper



OVERVIEW

Remove the guesswork, reduce the anxiety, and optimize your space virtually.

In today's competitive manufacturing landscape, efficiency and agility are crucial for success. Manufacturers are constantly seeking ways to optimize their operations, reduce costs, and improve product quality. The reality is that keeping facilities up-to-date and running at optimum capacity is an enormous and ongoing effort, and change in any form is hard.

When a manufacturing facility undergoes any level of change, it often comes at a very high price. When that change requires production to be shut down, even for a short amount of time, that cost skyrockets. So careful and thoughtful planning is paramount.

Virtual factory simulation software has emerged as a powerful tool for achieving these goals. By creating a full digital replica, sometimes referred to as a digital twin, of a physical factory, manufacturers can test and evaluate new layouts, run production lines virtually to evaluate the impact of changes, and test technologies before they are implemented in the real world. This can help to identify and eliminate potential problems, optimize resource and space utilization, and improve overall production efficiency. It also goes a long way toward calming the nerves of teams involved in the often Herculean tasks of retooling production environments.

While larger companies have been among the first to leverage virtual factory simulation, price points have dropped to a level that makes it now more widely available to small to mid-sized businesses (SMBs) in manufacturing. The ability to simulate factory planning using virtual tools provides several significant benefits for small manufacturers, enabling them to compete effectively in today's dynamic manufacturing landscape.

These benefits include:

- **Reduced Costs and Improved Decision-Making:** Small manufacturers often operate with limited resources and budgets. Virtual factory simulation software allows them to test and evaluate different layout configurations, process flows, and equipment placements without the need for physical prototypes or costly modifications to the actual factory. This reduces the risk of costly mistakes and provides valuable insights for making informed decisions that optimize resource utilization, minimize downtime, and improve overall efficiency.
- **Enhanced Agility and Adaptability:** The manufacturing industry is constantly evolving, with new technologies, market demands, and customer expectations emerging rapidly. Virtual factory simulation software enables small manufacturers to adapt quickly to these changes by allowing them to simulate the impact of new processes, products, or equipment before implementation. This agility is crucial for maintaining a competitive edge in a dynamic market.
- **Improved Collaboration and Communication:** Virtual factory simulation software provides a shared platform for stakeholders from different departments, such as engineering, production, and operations, to collaborate and communicate effectively. This collaborative approach fosters a shared understanding of the factory layout and processes, leading to better decision-making and improved overall performance.

- **Enhanced Safety and Ergonomics:** Virtual factory simulation software allows small manufacturers to assess potential safety hazards and ergonomic issues before implementing new layouts or processes, which can help prevent workplace accidents and improve worker comfort and productivity.
- **Improved Training and Onboarding:** Virtual factory simulation software can be used to train new employees and provide ongoing training to existing staff. This immersive training method allows employees to gain a better understanding of the factory layout, processes, and safety procedures.



SEEING IT IN ACTION

Numerous manufacturers have successfully implemented virtual factory simulation software to improve their operations, including many SMBs in manufacturing. One such company is Behlen Manufacturing Co., a 100-year-old metal manufacturer with over 1,100 employees, located in Columbus, Nebraska.

Due to over 80 years of operations at the massive factory, the multiple business units have overlapping production lines and processes, resulting in a stockpile of old, new, and custom-made equipment—some still used and some not; various materials; and a variety of furniture, cabinetry, and storage racks. Over the years, each business unit has taken up any available space, contributing to bottlenecks that impede factory flow.

“Our plant layout has become something of a hodgepodge with certain jobs moving back and forth from one end of the building to the other when they could have benefitted from better flow within the factory plant layout,” explains Process Engineer James Kucera.

After an intensive search, Behlen invested in the cloud-based [Factory Simulation Engineer](#), part of the 3DEXPERIENCE® Works Manufacturing solutions portfolio. Factory simulation gives Behlen the ability to analyze multiple production scenarios within 2D, 3D, or point-cloud environments, and it delivers a 3D visualization of the facility to diagnose problem areas to improve performance.

Behlen scanned its entire 900,000-square-foot factory in a week, producing over 3 billion cloud data points from which a virtual 3D model was created. The data is broken down into six- by eight-foot grid sections that model everything in the plant, from conveyors to trash cans. Factory Simulation Engineer provides data granularity down to 1/16 inch for every item, so it's easy to visualize the exact impact of potential configuration changes.

Behlen has laid the foundation for coordinating many lean manufacturing approaches of smart factories with the help of Factory Simulation Engineer. The company will use the solution to evaluate material, process, and other workflows to improve standardization, efficiency, and collaboration of business and engineering groups across the factory.



VIRTUAL ENVIRONMENT REDUCES COLLABORATION CHALLENGE

With the cloud-based product, the company's three business units can collaborate more frequently and effectively regarding space and equipment to improve the efficiency of their individual operations and uncover potential collaborative business opportunities that will contribute to Behlen's overall success.

"We now have the capability to show the business units where there is commonality across their machines, equipment, and processes and to visualize how individual moves—like bringing in new equipment or tearing out something old—will affect not

just their individual operations but overall factory flow," Kucera concludes. "This is critically important for driving lean principles as well as making sure that a reconfiguration makes sense. For instance, one move may result in 20 related moves. With Factory Simulation Engineer, we can visualize all related moves and make better decisions and avoid situations where we need to reconfigure two or three times because something was missed."

You can read the full case study on Behlen's use of Factory Simulation Engineer [here](#).



HOW TO GET STARTED

Knowing you have a problem is just the first step. Identifying the solutions developed by a vendor you trust that can help you overcome those challenges is step two. The most important step, however, is implementation, which requires thoughtful planning and preparation.

Manufacturers who are considering implementing virtual factory simulation software should take the following steps:

- **Define your goals and objectives:** Clearly identify what you want to achieve with simulation software and determine what group will drive its implementation.
- **Select the right software:** There are a number of different virtual factory simulation software packages available. Choose a package that meets your specific needs and budget from a vendor you trust or have an existing relationship with.
- **Get buy-in from all stakeholders:** Make sure that everyone involved in the project understands the benefits of simulation software and is committed to its success. This is key to developing a culture of continuous improvement.
- **Develop a training plan:** Train your employees on how to use the simulation software to foster a culture of continuous improvement. This includes executives who need to be able to sign off on large facility improvement projects and can better understand by seeing the impacts of moves in 3D.
- **Start small:** Start with a small project, or pilot, to get experience with the software, and then gradually expand your use of it.
- **Continuously improve:** Use simulation software to identify and address ongoing issues in your manufacturing process as well as to facilitate future expansion efforts.

To learn more about how Factory Simulation Engineer can remove the guesswork—and stress—from your next manufacturing facility update, [check out this video](#).



THE BOTTOM LINE

It's a challenging time to be a smaller manufacturer with unstable supply chains, an upswell in reshoring, and a lingering skills gap. SMBs in manufacturing must strive to make well-informed decisions quickly and to remain agile so they can react and pivot to changes in customer demand.

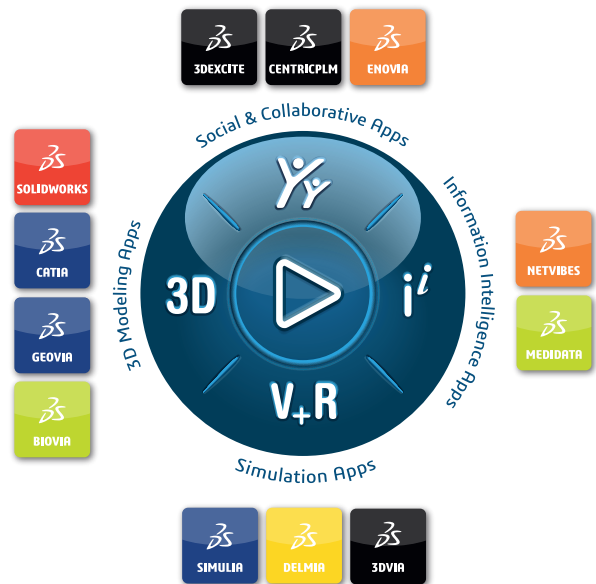
Virtual factory simulation software provides small manufacturers with a powerful tool to optimize their operations, reduce costs, mitigate risk, improve decision-making, and enhance their overall competitiveness in the manufacturing industry.

Discover how you can start your smart manufacturing journey today by learning more about Factory Simulation Engineer, a role in the [3DEXPERIENCE Works Manufacturing portfolio of tools](#).

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